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ISSUE 13

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MARVEL PLATES LAB



### CALEB DESCHANEL, ASC

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SUCCESS STORY: SPIDER MAN: FAR FROM HOME CINEMATOGRAPHER: MATTHEW LLOYD, CSC Release: 2019

### MANAGING DATA: FAR FAR FROM HOME

Codex Drives Color Pipeline Innovation on Spider-Man: Far From Home.



Most cinematic superheroes of today were born in the 1950s low-tech medium of

**comics.** Today, the astonishing on-screen derring-do of these spandex-clad characters is made possible by the highest of high technology. And behind the scenes, the success of Marvel and others is driving change at an unprecedented rate.



This system is genius... Francesco and Codex have cracked the code. I loved how the images looked Matthew Lloyd, CSC *Spider-Man: Far From Home* is a perfect example. Codex, working closely with DIT extraordinaire Francesco Giardiello, developed and implemented a change in color-pipeline methodology on that project, and while it may seem like a subtle tweak to the process, the adjustment could save thousands of hours of work and many dollars going forward.

Essentially, Codex and Giardiello developed a much more efficient way to match footage across scenes and takes destined for the visual effects pipeline. This new method takes advantage of existing tools developed over the years by Codex.

In the standard procedure, the director of photography lights and shoots the scenes and the rushes go to the lab, where a dailies colorist makes a one-light grade, usually using ASC-CDL values that are baked into the images used for editorial. When on-set live grading tools are used, the DIT provides the ideal look to post-production, again mostly using ASC-CDLs. Both the DIT and the dailies colorist end up using the same tool for both purposes: to create a CDL designed to be the cinematographer's artistic intent for the picture, and as a sort of matching mechanism used to balance shots.



Problems arise when the footage goes to VFX, where the dailies CDL grade is removed from the equation, and artists work on the raw files to maximize image quality and flexibility for the compositing process and CG integration. Because that CDL grade contains both the look along with the matching grade, removing it sends the footage back to its original state, which therefore won't necessarily match. Perhaps the scene cuts between two shots that were done with different lenses or are otherwise inconsistent and will now require a "technical grade," which will be performed by VFX prior to starting their work. This can cause delays and could generate new inconsistencies. It's also inefficient and duplicates work.

"If you design your CG element to work with the color and texture properties of a master shot from a sequence, it's not necessarily going to match the entire scene," says Giardiello. "That forces VFX to pre-grade everything and the DI colorist to create masks and possibly add layers upon layers to balance the live action with the CG elements across all of the footage."



Work expands exponentially. Creating a "double CDL" workflow was partly an early attempt to address this issue, but linking footage to a separate CDL file circumvented the problem without actually solving it, says Giardiello, and often came with its own issues. "The real solution was to find a way to provide well-balanced footage to visual effects," he says.

After six years of testing and iterative improvement using Codex Production Suite and several software and hardware tools developed by Codex for the purpose, a solution was achieved. The new method takes advantage of the RAW capabilities of the cameras used on complex, effects-intensive projects like *Spider-Man: Far From Home.* Marvel, known for strict guidelines regarding workflow, required extensive testing before agreeing to the new procedure.

"These cameras offer the ability to modify the way their sensors see the scene," Giardiello explains. "Using 3x3 matrices and transform equations, you can reach a sweet spot. That doesn't necessarily work on the set, because it can take too much time. But by getting into the RAW footage and modifying the RAW metadata, we can interpret the footage so that when it comes out from the de-Bayer, it has balance already baked in. It's much simpler than complex systems like two-layer CDLs, where things could go downhill once you leave the software framework or send it to a different vendor."

The method uses Codex Production Suite in conjunction with Codex's Review Module to adjust color temperature, tint and exposure index. Afterwards, a normal CDL can be applied.



"People think of those controls as a representation of an analog world, but we saw those as simply numbers that can be changed to adjust the footage," says Giardiello. "When VFX gets the footage as an OpenEXR file, it's already well balanced, and incorporates a CDL as a single look that's applied to everything in that scene or that environment."

In a way, the method enables a return to first principles for cinematographers, who can think as they did in the days of film emulsion, changing colors using lighting and gels on the set while depending on a consistent reaction in the camera – like that of a film stock. On *Spider-Man: Far From Home*, Giardiello and director of photography Matthew Lloyd, CSC designed the entire film's color using just 48 CDLs – a number that often reaches thousands on complex projects. On the shoot, data managers Will Gardner and Andrea Michelon, working in a purpose-built truck, started balancing the footage almost immediately, guided by a master shot identified early in the work day. Later, Giardiello reviewed the work.



"The visual effects vendors are telling me that it's going to save them hundreds of hours," he says. "That's essentially what it is – a time saver. It's nothing you can't achieve in postproduction, given enough time. It's like having a dailies colorist on the set, but way more accurate and efficient, and you don't have to time the rushes in three hours overnight. Instead you have a whole day to do so and the eyes of three people to judge the footage. Even the trailer's color is remarkably close to our original on-set color correction.

"This system is genius," says Lloyd. "Francesco and Codex have cracked the code. I loved how the images looked, additional off-set dailies color correction was not needed. Francesco's CDL work was right on the money, and had a lot to do with how smoothly it went. If there was a tricky shot, we could always go back to the 'neg,' put the LUT on, and look at the CDL from the set. You can see how the image ended up where it is. As far as the on-set work making its way into the DI, this was definitely one of the cleaner experiences I've had. It puts control back in our court. You don't have to throw away all that work and start building the look from scratch in the DI. I really appreciate that there are people thinking about what the intention is, and how to preserve it from capture to finish."



Camera Type: ALEXA Mini Camera Rental by: ARRI Rental UK Final Color/DI: Jill Bogdanowicz – Supervising Finishing Artist at CO3 Director: Jon Watts Director of Photography: Matthew Lloyd, CSC DIT: Francesco Giardiello



SUCCESS STORY: THE LION KING VISUAL EFFECTS SUPERVISOR: ROBERT LEGATO, ASC Release: 2019

### ROBERTLEGATO ASC DISCUSSES HE LON KING

The VFX Supervisor helps visualization with Virtual Reality.

After a mere twelve days in release, Disney's *The Lion King* blew past a billion dollars at the worldwide box office. The success must be gratifying for director Jon Favreau and his team, led by director of photography Caleb Deschanel, ASC and visual effects supervisor Robert Legato, ASC. The trio pushed virtual filmmaking to new heights with the film, working with VR headsets while providing a comfort zone for Deschanel, a six-time Oscar® nominee who brings old-school chops to the undertaking. Legato, who has three Oscars on his mantle, built on his impressive accomplishments with Favreau in 2016's *The Jungle Book*.



We shot reference material in Africa with an ALEXA 65 was to get the soul or the spirit of the place Robert Legato, ASC What follows are excerpts from conversations with Robert Legato, ASC and looking back on the experience of working at the intersection of high technology and cinematic storytelling using the ARRI Rental ALEXA 65 and Capturing on Codex.

My background is in cinematography, so the live-action sensibility is naturally what I bring to visual effects as a matter of course. After *The Jungle Book,* we came up with a new way of creating virtual reality tools that allows you to put on a visor, and see and feel a semi-realistic live action simulation. It becomes the next best thing to being there and sometimes even better than being there. Almost immediately, your instincts kick in and you're crouching

behind a tree or rock and looking for that interesting angle. You don't have to think about it. It's not a technical exercise. You're looking at what it will be, and you're thinking of how to create that perfect shot instinctively. The thing that makes it so accessible is the real-time analog feedback nature of it. You start to feel like you're just making a movie, and stop thinking about the technology behind it.



On a real location scout, you always have to try to communicate with the production designer, cameraman and the director, to discuss what the location might ultimately be once the VFX are added, but in VR you have many more options. You can make a suggestion right then and there, for all can see and collaboratively embellish the concept in real-time. "What if we put this stream further to the right, add a few trees over here, and shoot in later light?" – that sort of thing. The director can weigh in as he or she sees the alterations take shape, which might alter their blocking, or the vision of that particular scene. We can also preview a Steadicam, crane, dolly or handheld right there on the scout to really preview the finished

result. The result is a much more thought out and fleshed out concept at the very beginning stages of inception. The outcome is far more evolved as a result.



Specifically Henry Tirl had a sensor on top of his rig, which was appropriately weighted to mimic a real camera, so Henry could instantly feel comfortable and translate his genius for choreography and composition as though he was on a real set. In The Lion King, you get a sense that it's a conventionally filmed movie because in essence, it is. And that enhances the believability of the imagery. You feel the soul of the operator because he's always behind the camera making subtle adjustments as you do in a real live action film.

Instead of making it technically easy for VFX, we made it easy for live action filmmakers to use all their analog skills, and that's different. Others in VFX might try to make it perfect because they can, but we didn't really want perfection. In the real world, you try to make it perfect and it never is, because there are just too many factors fighting against you. In the computer world, everything's perfect, but you don't want that. It's too sterile and mechanical. So we mix the two together to create the illusion that we must have waited for the right time of day to film that scene, for example. We might also re-block a scene to make it a little more interesting once we have seen an edit on the set, and then have another crack at it to create a filmic shortcut that tells the story in fewer, more elegant cinematic shots. We never have to worry about missing that opportunity because of fading light. It is much easier to be a genius in hindsight.



We shot reference material in Africa with an ALEXA 65 was to get the soul or the spirit of the

place. You do feel some spiritual essence that comes from the land and the animals and the ecosystem, how it's been perfected over millions of years. I would have liked to root the visual effects with this same sense of spiritual reality, but I couldn't this time because there are no actual live-action plates in the film. So we shot reference material that captured that soul in spades. I loved working with the A65 because you're shooting high dynamic range raw with the largest format possible. There's a beautiful epic film quality that you get from having so many more granules or pixels to resolve an image from a large sensor. That actually helps with the lighting and makes for softer roll-off in the blacks because there's so much more resolution. Our thought is that if we actually shot this practically, this would be the format and camera we would use. We mimicked the 65 mm film-back in the computer as well, so that that the lenses and the depth of field feel the same. That's subtle stuff, but I like to think that the audience picks up on that even if they don't exactly know what we were doing. I always use ARRIRAW. It's easy to work with and I always have the best version of the film captured. I can get any format and resolution I want out of it. I pulled the ARRIRAW Africa footage at the beginning of our process and looked at a 4K DCP at IMAX in 1.43:1, just to get the gestalt of what it feels like actually filmed live.



It was just so fantastic-looking – the exact quality we were hoping for. What's the point of not shooting with that extra resolution that the ALEXA 65mm gives you? I grew up thinking that the very best and highest quality movies were shot in 65. You do absolutely sense and feel it. It does something intangible, at least for me. If you're going to go for it, go for the best you can get and you will never be disappointed. The footage is gorgeous – spectacular.

Camera Type: ARRI ALEXA 65 Camera Rental by: ARRI Rental Director: Jon Favreau Director of Photography: Caleb Deschanel, ASC DIT: Company 3 – Stefan Sonnenfeld

Behind the scenes images courtesy of American Cinematographer. All other images courtesy of their respective owners.



SUCCESS STORY: I AM WOMAN Cinematographer: Dion Beebe, ACS, ASC Release: 2019

### HEAR ME ROAR!

HDE enables Large Format RAW capture with the ALEXA 65 on *I Am Woman.* 

For his most recent assignment, Dion Beebe, ACS, ASC returned to Australia to shoot *I Am Woman*, the story of Aussie native Helen Reddy and her 1972 hit song that became an anthem of female empowerment. Beebe's wife, Unjoo Moon, directed Tilda Cobham-Hervey in the lead role. The budget was reportedly a relatively modest \$7 million, and the schedule included about 30 shoot days in the Sydney area, which often doubled for Los Angeles or New York. Extensive rehearsals helped make the actual shoot go quickly and smoothly.



Despite – or perhaps because of – the relatively modest budget, the project ended up as one of the first to take full advantage of HDE – High Density Encoding, a completely lossless encoding technique that reduces ARRIRAW data files up to 45% from their original size, but delivers bit-for-bit lossless fidelity when the file is decoded. HDE results in tremendous savings in data management and storage, and in the case of *I Am Woman*, made it possible for Beebe to shoot with the large format ARRI ALEXA 65 with no significant adaptation of his on-set procedures.

HDE turned this production into something that was actually quite achievable Dion Beebe, ACS, ASC The film covers a range of periods from the 1950s through the 1980s. "Those time periods can be tricky, because you see them parodied so often," says Beebe. "We were trying to find a kind of realism that avoided that parody feeling. Also, we knew we couldn't control every single environment because of budgetary limitations. So we thought that the large sensor would help us in terms of soft falloff in the backgrounds, which would also help to disguise some non-period elements.

"But the most exciting part of the ALEXA 65 is really the portraiture it allows you," he says. "The larger format is great for any film that is primarily faces, because it creates a sort of contoured portrait. This story is essentially a character piece with

a significant performance aspect, and the large sensor combined with fast ARRI DNA lenses allowed us to shoot pretty wide open and let the backgrounds be less specific. That took some of the load off of our art and visual effects departments, particularly on exterior shots."

Early on, the shoot was planned for two ALEXA SXT cameras, but Beebe's reasoning convinced the production to shift to the ALEXA 65. ARRI Rental in the UK felt it would be prudent to have a second ALEXA 65 in the region as a backup. Informed of this, the production decided to fulfill Beebe's request and add a second ALEXA 65 and another operator, Velinda Wardell, ACS. But that move came with concerns about data management.



"There were many questions about how, on this size movie, we could handle not just the physicality of day-to-day shooting, but the management of the data in a time-effective and cost-effective way," says Beebe. "In the end, we were able to meet my expectations as well as the production's expectations in terms of how it was managed and how it costed out. We never had any problems turning dailies around to editorial through the course of shooting. It's a system that is efficient and that works. And it was invisible to me, which is good considering everything else I had going on, including a number of very big performance numbers."

Digital Imaging Technician Michael Easter says that part of his job was to make sure that the data management happened smoothly in the background. Cutting Edge was providing dailies and other post services. Colorfront On-Set Dailies was used to generate the editorial offline and to create the streaming dailies for Moxion.

"When ARRI Rental sent us the Vault XL running Codex Production Suite with a pre-release beta version of HDE support, it was obviously a very new release, but Codex had already published the HDE SDK (software development kit), so there was already support down the chain from vendors such as Colorfront, Pomfort, Baselight, Scratch and so on, which was pretty amazing," says Easter.

The Codex Capture Drives came off the camera with unprocessed image data and were loaded into the Codex Vault XL 65, which is the standard procedure with the ALEXA 65. The Vault then encoded the ARRIRAW ALEXA 65 files to HDE .ARX files and copied with an MD5 verification to domestic Samsung USB-C SSDs formatted as NTFS, allowing for rapid ingest into Colorfront On-Set Dailies. Then the CDL grade could be applied for the offline. Checksum verification and LTO backup followed.

"As with any workflow change, there's some time spent at first getting your bearings," says Easter. "But it soon became second nature. HDE did not add any administrative overhead. But it definitely saved operator time in terms of getting the data off to post and the colourist was then able to use the .ARX files in Baselight straightaway, treating it like RAW encoding and playback.

"In terms of my role, it meant less processing time," he says. "But I'm sure it saved Cutting Edge a lot of money. They initially went from planning to work with 2.8K ARRIRAW files, which then became working with 6.5K ARRIRAW files – turning over the material that's required for online and offline, as well as the spinning-disk backup and the LTO backup. By making that more manageable, HDE really turned this from a production that I don't think could have gone ahead in its current form to something that was actually quite achievable. HDE happened to become available just as they needed it, and I think that was pretty impressive."



Easter says there was a single glitch, but it didn't affect the production. At one point the Vault XL indicated a corrupt file. "I knew that was fine, because the ALEXA 65 itself writes the unprocessed data and does its own checksum from the sensor before the mag is offloaded," Easter says. "The camera itself will warn if there is a fault with the SXR Capture Drive or a risk of bad images. I let the key AC and the line producer know that we had an unexpected error that could potentially slow down delivery of the footage to post. I called ARRI Rental UK and Codex, and connected my laptop to the internet using my cellphone. Despite the time difference, we set up a remote session with Codex support, and with their help, we determined that it was a cable. Once the cable was reseated, the data came through.

It's a system that is efficient and that works Dion Beebe, ACS, ASC "What Codex supplied wasn't just the hardware and the software that enables us to produce these amazing pictures," Easter says. "They also provide the technical support to ensure the shoot goes forward without delay. I was a bit worried because in Australia, we are in a smaller market, and there is also the tyranny of distance. But Codex came through, and it wasn't just a tech support line or an email address. It all happened very quietly and quickly, and most important, it didn't hold up production."

Easter says he's looking forward to seeing HDE implementation in support of the ARRI LF and other ALEXA cameras. "Essentially, it will become just a click on the taskbar," he says. "The integration will be seamless. HDE is not going to add complexity to the process. It will just be another option, and a fairly intuitive one."

The DP, Dion Beebe says there's a lot of confusion out there about data management and compression rates. "Everyone is talking about 8K this and that, and often I think the production is misinformed about what it means," he says. "As a result, they resist large format and large files. They think they'll need someone transferring data 24 hours a day, and that's just not the case. I think we've proved that it's totally manageable, even on a small, intimate character movie where we're shooting a lot of data every day. We never had any problems turning dailies around to editorial or to us through the course of shooting. The system that's in place with ARRI and the Codex Vault with HDE is very manageable and efficient. It just works. And I think that the more people get informed about how we can shoot and manage large format, the better."

Camera Type: ARRI ALEXA 65 Camera Rentals by: ARRI Rental Lenses: ARRI DNA VFX Services by: The Cutting Edge



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SUCCESS STORY: FORD V FERRARI CINEMATOGRAPHER: PHEDON PAPAMICHAEL, ASC, GSC Release: 2019

# FORD V FERRARI PUTS THE VIEWER IN THE COCKPIT

Phedon Papamichael, ASC, GSC and James Mangold Blend Action and Character.

In many ways, *Ford v Ferrari*, the Fox-Disney feature film set in the world of 1960s auto racing, is a hybrid. The film exemplifies director James Mangold's career-long fascination with reconciling artistic aspirations with the dictates of commercial Hollywood studio production. The action is intense and competitive, but at its heart, the story is about the relationship between Carroll Shelby (Matt Damon) and Ken Miles (Christian Bale). And the movie takes advantage of today's filmmaking tools while avoiding the swooping, fast-and-furious style in

favor of the more intense and direct style of 1960s classics like Le Mans and Grand Prix.



We're trying to communicate what it's like in a little metal box with a huge engine and a bunch of fuel going 200 miles per hour The result looks like an artistic and box-office success, passing \$100 million in receipts in ten days, while garnering critical praise and awards, including a Golden Frog nomination at the 2019 Camerimage Film Festival in Poland – often a leading indicator for the Oscar race.

Director of photography Phedon Papamichael, ASC, GSC brought a lifelong interest in auto racing to the project. His uncle, Nick Papamichael, was a champion rally car driver and winner of the 1953 Rally Acropolis in Greece, driving the Jaguar XK120. On *Ford v Ferrari,* his goal was to deliver a sense of what it's like in the driver's seat.

"Jim and I are not action filmmakers per se," says Papamichael. "We're focused on the drama. Of course, we had elaborate rigs for shooting the racing scenes, which are extensive. But we're always asking ourselves how a given shot communicates a character's thoughts and feelings."



That instinct for character led in part to the choice of format. Papamichael and his team shot mostly with the ARRI ALEXA LF camera, using Panavision lenses specially adapted to fill the larger sensor area. Shooting close with wide lenses brings the viewer into the driver's world, while simultaneously including the environment – the track conditions, the other cars and drivers, and most importantly, the sense of speed and danger. Hard-mounted cameras, available natural light, and car-to-car shooting were in tune with the overall aesthetic. Russian arms and other remote camera systems generally couldn't handle the G-forces produced at high speeds. Visual effects were surprisingly minimal.

"Jim embraces being physically close to the space of the actors," says Papamichael. "I would have been happy to shoot everything on the 40 mm. With this combination of lenses and sensors, even if you're in tight, you're not isolating your actors. You always feel the environment and are able to compose with all their surroundings. You feel the proximity of the other cars, which are all precisely choreographed. We exposed Christian to all the movement and all the actual interactive light and reflections. We embraced the vibrations. We're trying to communicate what it's like in a little metal box with a huge engine and a bunch of fuel going 200 miles per hour. We thought that smoothing things out would be a mistake."



On the set, Papamichael is driven to improve every aspect of the frame continually. He considers himself a non-technical filmmaker. The high technology used to dependably capture the shot is not on his mind, and digital imaging technician Lonny Danler ensures that it stays that way. Papamichael and Danler first worked together on *Nebraska*, a black-and-white film that brought the cinematographer his first Oscar nomination. On *Ford v Ferrari*, the LFs were generally set to capture 4.5K ARRIRAW using a 2.39:1 excerpt of the full OpenGate sensor. The workflow used CODEX SXR 1TB High Speed Capture Drives and CODEX SXR Readers. Monitoring was done via 24fps 1080p Log C with a single LUT applied.



Papamichael's career path has been non-standard. His father was a well-known production designer in Europe who worked with John Cassavetes. The younger Papamichael was born in Athens, educated in Munich, and came to the U.S. before he was 21. Using a 16mm camera borrowed from family friends, he photographed a film that won a prize at the Cork Film Festival and was soon shooting low-budget features for Roger Corman, where his crews included future masters like Janusz Kaminski, Wally Pfister and Mauro Fiore. Since then, he has balanced more intimate work with more significant studio projects, forging relationships with visionary directors like Alexander Payne (*Sideways, The Descendants*) and Mangold (*3:10 to Yuma, Walk the Line*).

Regarding his affinity with Mangold, Papamichael says, "We have the same influences embedded in us. We love the same filmmakers. We love Ozu, and the Italian neo-realists, and the French New Wave, so we're speaking the same language. But more specifically, we have very similar compositional instincts and aesthetics. We're both still photographers. That really helps when you're making decisions on the fly."



Currently, Papamichael is shooting *The Trial of the Chicago 7* for director Aaron Sorkin. Set in a similar period, the film is being shot on the same combination of ARRI ALEXA LF and Panavision anamorphic lenses.

Camera Type: ARRI ALEXA LF Camera Rental by: ARRI Rental Director: James Mangold Director of Photography: Phedon Papamichael, ASC, GSC DIT: Lonny Danler

Images copyright 2019 Twentieth Century Fox Film Corporation

# NICK KAY: MONSTER OF THE DITS

Taming the large format data workflow.

DIT Nick Kay worked with cinematographer Lawrence Sher, ASC on both *Godzilla* and *Joker*, making sure the data kept flowing from the ultra large format ARRI Rental

**ALEXA 65 cameras.** Some scenes were shot spherical and full-frame when that might help with compositing or repositioning. Kay says that Sher, who started his career by shooting at least 25 features on film emulsion, still works in a traditional film method. But on *Godzilla* he often operated A-camera using a Libra remote system controlled remotely by a "Hand Held" console that can be carried on the shoulder.



"Larry would basically operate at my cart, looking at both cameras," says Kay. "The A-camera focus puller would be in the tent with us, all on one little network. That was good for the vibration stuff and the monster feel. That was pretty cool." Monitoring was in P3 colorspace.

Since the ALEXA 65 came out, we haven't really had to redesign things Nick Kay "We were thinking of how the dailies colorist would be viewing things," says Kay. "I have Barco monitors that I use when people are grading on projectors – I find them easy to calibrate together, with the same black and detail. Larry and Jill Bogdanowicz, his final colorist, have worked out some LUTs, which we tweaked until we found something he liked for this show. Working with the ALEXA 65 was straightforward. We downloaded media from Codex Vault 65s onto Codex Transfer Drives, which were sent to the near-set lab and ingested. It was efficient for us, because we would roll so much, and we could recycle our own mags."



Kay feels that the workflow with Codex has settled things down to some degree. "Since the ALEXA 65 came out, we haven't really had to redesign things," he says. "Right now, it's fairly standardized. On *When They See Us* with Bradford Young, we were doing two grades on set, SDR and HDR. So that was interesting. But on *Joker*, we used a workflow very similar to that on Godzilla." Now with Codex High Density Encoding reducing the file size of the ALEXA 65 data by as much as 2:1 with little to no impact on copy times, the workflow is becoming even more standardized.



*Godzilla: King of the Monsters* - was released on May 31, 2019 in 2D, 3D, Dolby Cinema, RealD 3D and IMAX. A post-credits sequence teases the next film – by some counts the 33rd *Godzilla* movie – *Godzilla vs. Kong*, release date March 13, 2020. That film is being shot by Ben Seresin, BSC on the ARRI ALEXA 65.



Camera Rentals by: ARRI Rental

Dailies Colorist: Ben Estrada

Final Color/DI: Company 3 – Jill Bogdanowicz

**Director:** Michael Dougherty

Director of Photography: Lawrence Sher

DIT: Nick Kay



SUCCESS STORY: CAPTAIN MARVEL Cinematographer: Ben Davis ASC Release: 2019

### THE MARVEL Plates LAB

Marvel's innovative approach to VFX with its Burbank centralised facility.

Since its debut in March of 2019, Marvel Studios' *Captain Marvel* has brought in more than \$1 billion at the box office. Produced by Marvel Studios and distributed by Disney, the film places a female superhero at the center of the action.



"The story is a very personal and intimate journey," says director of photography Ben Davis, BSC. "It's one woman trying to find out who she was and where she comes from - to discover herself. It's her story, and the camera must connect with her. It's a wider lens-close camera approach, with a handheld camera communicating a human response to her actions. We're trying to tell a story and connect the audience emotionally with the character."

Meanwhile, behind the scenes, Marvel Studios' state-of-the-art visual effects process provided no shortage of astonishing cinematic legerdemain. Over the course of more than 20 films in the Marvel Cinematic Universe, Marvel Studios has fine-tuned its VFX practices, taming a Wild West of formats and tools and streamlining the assembly process to make polished, photo-real miracles an everyday occurrence. Codex has been an essential partner in this endeavour.

We always have a lot of confidence in the Codex Vault platform Ben Davis. BSC On *Captain Marvel*, visual effects supervisor Chris Townsend oversaw contributions from eleven different companies, including ILM, Framestore, Digital Domain, and Trixter. Steven Shapiro, Director of Production Technology, also played a key role, as did Michael Maloney, who served as Manager of Image and Color for Marvel Studios. Maloney is responsible for the image and colour workflow on all Marvel Studios productions.

Marvel Studios is unique among studios in that it coordinates VFX and VFX plate pulls at its own centralised facility, in Burbank, called the Marvel Plates Lab. This arrangement has been in place since Guardians of the Galaxy Vol. 2. The

Codex Vault is an essential part of the pipeline. Every frame from the camera is stored in an air-gapped storage pool. When a VFX facility needs a particular piece of imagery to complete its work, they submit an EDL, which is uploaded to the Codex Backbone, which communicates with the Codex Vault XL system and generates an OpenEXR files from the RAW camera negative. Shot metadata and CDL information from the set accompany the files, as does a reference QT file.



On *Captain Marvel*, Davis shot with ARRI ALEXA 65 large format cameras and used the Codex Vault 65 for on-set and near-set media management of the resulting data-rich image files. "Consistency is very important to us, not only within a project, but across multiple shows," says Maloney. "We use ACES colour management, which is fully supported in our Codex Vaults. We also appreciate that the Vaults are always faithful—they refer to the camera SDKs, unlike other software, where we sometime run into problems. We always have a lot of confidence in the Codex Vault. If specific updates are needed for a certain workflow, Codex is very responsive to our needs. We have a great relationship."

Matt Walters, CTO at Codex commented, "Pushing the envelope and is always risky, but since we have such a good development relationship with the Marvel team, we are both testing and communicating our findings as soon as we have a new camera or process working. Before we deliver anything to Marvel we make sure it is rock solid at that point, and we know it is going to be ready for everyone else too."

Traditionally, several departments feed into a production workflow. There's software on the set used to control the image, and a dailies facility processes the dailies. VFX does their work, and eventually the digital intermediate brings everything together. Plates need to be delivered to all the various facilities, including effects houses.

"We found that by internalising this process, we are at the centre of the workflow making sure that we've validated the various image and colour pipelines end-to-end," says Maloney. "With the Codex Vault, we de-Bayer all of our plates from all cameras into a common EXR set of imagery, with a common ACES colour space. But then we also provide workflow templates that validate the deliveries from onset to dailies before we deliver it to VFX. So we basically do a validation or QC check of the work prior to delivering to VFX. That helps bridge the gap between those two departments, so that we know that the plates that are delivered to VFX and DI truly represent what is viewed onset."



One goal is efficiency. Another is to create dependable standards that translate to future projects. Working against that goal is the accelerating pace of change. "The challenge of creating these standards is keeping up with the latest technology," says Maloney. "Marvel Studios productions always want to use the latest and greatest cameras that are released. One huge benefit of using the Codex Vaults is that they tend to be among the first to update to the latest SDKs to support the newest cameras. We can very quickly integrate new cameras and workflows into our production pipelines."

In some cases, Maloney is interacting with dailies facilities that use Codex Production Suite. On *Captain Marvel,* Technicolor provided the dailies using Colorfront. In the near future,

HDE (High Definition Encoding) will make the movement of image data much more efficient. On Captain Marvel, the data-rich RAW files coming off the ALEXA 65 sensor helped lay the foundation for subsequent manipulations.

"The idea is to get the cleanest image possible, in layman's terms," says Maloney. "We make a lot of grading adjustments to the camera imagery, in some cases to match different cameras seamlessly. We do a theatrical release and an HDR release. We need to maintain as much of the range and image fidelity that the sensor can capture as possible, so that we have the flexibility and latitude for all the departments downstream. Most of the cameras are capturing more than today's consumer HDR displays can show, and frankly, we require all that latitude in post production in order to make the imagery that we make."



Looking to the future, Maloney says that he and Marvel Studios have been working closely with Codex on expanding flexibility in grading. "We are constantly trying to get better at quickly balancing some of the differences between multiple cameras and shots," he says. "We're envisioning a grading system that is very flexible for balancing things out but is also nondestructive in terms of delivery to departments downstream. We'd like to streamline that, to become more efficient and to separate that idea from the creative look.

"We're also looking at the ability to view and deliver things in HDR throughout the process," he says. "Right now, a lot of our deliverables are in HDR, but we're working on making it part of the production from the set to final delivery. We're actively testing that now."

No doubt Codex will be an important part of the solution, as they have been on virtually every Marvel Studios production, including *Spider-Man: Far From Home*, released in July 2019.

Camera Type: ARRI ALEXA 65 Camera Rentals by: ARRI Rental US Lenses: ARRI DNA VFX Services by: Marvel Studios, ILM, Framestore, Digital Domain and Trixter

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SUCCESS STORY: GODZILLA: KING OF THE MONSTERS CINEMATOGRAPHER: LAWRENCE SHER, ASC Release: 2019

# GODZILLA: KING OF THE MONSTERS

Long live large format.

In 2015, the original 1954 *Godzilla* was named by Variety as one of the ten best monster movies of all time – presumably due to its outsized cultural impact. It's true – the

longest-living film franchise in history began with an actor in a lizard suit.



In any event, the fearsome creature has returned to the big screen in Warner Bros.' *Godzilla: King of the Monsters,* directed by Michael Dougherty and photographed by Lawrence Sher, ASC, recently profiled in Variety's "Million Dollar Cinematographer" series. It's the third film in the Legendary MonsterVerse, and while critics targeted the film's character development, most agreed that the visual effects and action scenes were superlative. After three weeks in release, the box office took in roughly \$350 million.

The workflow was seamless Lawrence Sher, ACS The film was shot mostly in Atlanta, with some scenes shot in the historic center of Mexico City. Sher says that he and Dougherty wanted to make sure that the imagery had atmosphere and texture reminiscent of the '80s sci-fi movies they loved as kids, like *Close Encounters* or *Alien.* They were drawn to anamorphic format for the intrinsic personality of the glass, but decided to test the medium-format ARRI ALEXA 65, which seems appropriate given their star's gargantuan scale.

"Approaching a movie that we knew would be released in IMAX and in 3D, we thought, "Why not look into this large sensor?" says Sher. "With anamorphic, there was a slight sensor reduction, but I fell in love with the feel of it immediately. Suddenly, you're getting all this increase in image quality, but you're also continuing to constrict depth of field. Anamorphic was the original 35mm large format, in a way, because you're using the greatest possible negative area, and that translates to digital with the 4:3 chip. Now, with an even bigger sensor and more of that large format feeling, it really elevated the movie. And it gave us futureproofing in terms of image size and increased resolution. Knowing that we were making an event picture for the biggest screens out there, the ALEXA 65 felt like a beautiful fit."





Even on a project with a budget approaching \$200 million, the additional data management can be a concern. But those worries are increasingly a thing of the past. "It's still a conversation with the studio and the producers, but we pushed forward with it and had no problems at all," says Sher. "The workflow was seamless. For most of the time we've been living in a digital world, most producers felt that 4K wasn't worth it. It's always been a head-scratcher to me – if you shot a tiny Netflix movie, you would be forced to shoot 4K, but a \$150 million action movie – 'just do 2K.'

The idea of gaining front-end resolution, which you might think would be amazing for IMAX, or even for other deliverables, wasn't really a major factor. But I think there's been a tipping point this year.

As we approached *Joker*, and made the decision to shoot ALEXA 65 in 5K, people behind the scenes at Warners seemed to appreciate having a 4K master – something that wasn't usually an option just a year or two ago."



Camera Type: ARRI ALEXA 65 Camera Rentals by: ARRI Rental

Dailies Colorist: Ben Estrada

Final Color/DI: Company 3 – Jill Bogdanowicz

**Director:** Michael Dougherty

Director of Photography: Lawrence Sher

DIT: Nick Kay



SUCCESS STORY: THE LION KING CINEMATOGRAPHER: CALEB DESCHANEL, ASC RELEASE: 2019

# CALEB DESCHANEL, ASC DISCUSSES LION KING

Tech nerdology to the extreme!

After a mere twelve days in release, Disney's *The Lion King* blew past a billion dollars at the worldwide box office. The success must be gratifying for director Jon Favreau and

his team, led by director of photography Caleb Deschanel, ASC and visual effects supervisor Robert Legato, ASC. The trio pushed virtual filmmaking to new heights with the film, working with VR headsets while providing a comfort zone for Deschanel, a six-time Oscar® nominee who brings old-school chops to the undertaking.



It's tech nerdology to the extreme – and it looks beautiful. It's really remarkable... Caleb Deschanel, ASC What follows are excerpts from conversations with Deschanel and his use of the ARRI ALEXA 65 to capture the live action plates on Codex media in ARRIRAW and looking back on the experience of working at the intersection of high technology and cinematic storytelling.

"I really liked *The Jungle Book* – I thought it was amazing. What got me excited about *The Lion King* was Jon's idea of bringing my expertise of shooting liveaction films over the past 40-some years. They had designed the tools to be very similar to what I've been used to all this time. We had dollies and cameras and lenses – everything you'd expect on a regular movie. The locations only existed in virtual reality. You put on the glasses and you're in Africa. Jon worked

with the animators for performance, and got the performances from the voice actors. So in a way it was sort of pre-blocked. Early on, we would have animals walking through rocks and things like that, but as time went on, they perfected it. Eventually you could understand the animals' emotions and really get what was going on."



"Honestly, I was worried about having to become a tech nerd or something in order to do this. But it was so beautifully designed by Rob and his team. They made me feel very

comfortable and made it very easy for me to just drop right into this kind of filmmaking – and have a good time doing it. It's tech nerdology to the extreme – and it looks beautiful. It's really remarkable, but you don't realize the incredible amount of mathematics behind it to get to that point. I was always good at math in school, and I loved it. But the stuff these guys are dealing with is beyond anything I could imagine."

"Jon and the animators would block the animals, and Rob and I would make suggestions on how to improve it to simplify it or make it better for the story. We'd get the re-animated files on set, and I would light it with my lighting director, Sam Maniscalco. We'd pick one of 350 skies based on the time of day and the particular feeling, and we'd put the sun where we wanted it. Even though we were not following the sun across the sky the way you do on a real location, we did not leave the sun in one place, but moved it on almost every shot. In virtual reality, we had the computer team lay the dolly in the virtual world, and then connect it to a real dolly on stage. We then had a real dolly, and a dolly grip who would follow the "actors" the way you would on an actual location."



"The movie feels real because of two things. One, the animation is phenomenal, and the sets are phenomenal. The backgrounds and the trees and the vegetation and the rocks – everything is so beautifully done. But another thing that adds to the reality is the feeling that there is a person behind the camera, operating it – the way you do in a regular movie, where the camera is being operated by a human being. And that gives it another sense that is important for the audience to feel it's a live action film. The one thing I missed with the process was the serendipity of what happens when a storm rolls in unexpectedly or an actor comes up with some new idea while he's performing that surprises you. But we were able to make up for that because we could repeat actions any number of times. It was easy to move a hundred wildebeests back to one by pressing a button. You didn't have to wait for the wranglers to go track them down at the end of the gorge and drive them back to the beginning position."

"No matter how advanced the technology becomes, you're really always telling a story. If you don't tell a story that compels the interest of the audience, then you really haven't done anything more than show off some technology. It's what we have always done: tell stories – live action or not."

Camera Type: ARRI ALEXA 65 Camera Rental by: ARRI Rental Director: Jon Favreau Director of Photography: Caleb Deschanel, ASC DIT: Company 3 – Stefan Sonnenfeld

Behind the scenes images courtesy of American Cinematographer. All other images courtesy of their respective owners.



### THE EVOLVING ROLE OF THE DIT

Twenty years ago, the term Digital Imaging Technician didn't exist.

The role of the Digital Imaging Technician or DIT came into existence during the transition from film to digital origination. Digital cameras required a new skill set, or at the

very least the application of skill sets learned elsewhere. Some cinematographers were more comfortable with this new technology than others and so many came to rely on a trusted DIT to assist and support them, working with them on multiple productions. For example, Simone D'Arcangelo has supported Vittorio Storaro ASC AIC on multiple feature films including *Wonder Wheel, A Rose in Winter* and *Café Society* and generally works with him from pre-production through to the digital intermediate grading to ensure that the look he creates makes it to the theater or home.



Although the job can encompass many things, this is a critical role - working alongside the cinematographer, ensuring that he or she can achieve their desired look digitally. In the short time that the position has existed, the role has evolved and the importance of the DIT has increased. Interestingly, in the United States, the new President of the Local 600 or International Cinematographers Guild is Lewis Rothenberg, a New York based DIT who has worked on many feature film and television projects, including *The Greatest Showman, In Treatment, The Dead Don't Die* and *Nurse Jackie.* 



So who becomes a DIT? Their backgrounds can vary from an experienced video engineer to a novice cinematographer to a computer nerd. Some have gone to film school, some have

learned on the job. According to Tom Mitchell, technical director of Mission, a UK-based DIT and digital services company, the three top skills that a successful DIT needs are good communication, problem solving and technical know-how, none of which are necessarily taught in film school.

Although it doesn't always happen, in an ideal world, the DIT works with the DP during pre-production and camera tests, planning and testing the workflow and color pipeline in conjunction with post production personnel such as the digital intermediate colorist or the dailies facility. They are often the liaison between production and post production during production, if not creating the dailies then working closely with whomever is. During shooting, the DIT is a key member of the camera crew, handling settings on the digital camera such as recording format, frame rate and outputs. In order to assist the DP in creating and communicating his vision, the DIT performs tasks during the shoot day such as monitoring exposure, creating and applying look-up tables (LUTs) and live grading using software like Pomfort's Live Grade. Additionally, although a crew may sometimes include a data wrangler of digital loader, the DIT is ultimately responsible for quality control and ensuring the original camera data and metadata are backed up, sometimes multiple times a day. The DIT may also be the last one standing at the end of a long shoot day, creating dailies for editorial and viewing if there isn't a dailies facility involved, as well as backing up data.



Given all the tasks and responsibilities now falling under the purview of the DIT, perhaps it's time for the role to be expanded to something like a Digital Workflow Supervisor or a Digital Acquisition Supervisor. As an example, Francesco Luigi Giardello, one of the busiest DITs in the world, seems to have made this leap. On *Spider-Man: Far From Home*, Giardello worked closely with Codex to design an innovative color pipeline that delivers balanced footage as Open EXR files to the VFX facilities, along with CDL data. This approach removed the need for a dailies colorist and ensured that cinematographer Matthew Lloyd's vision was carried through from set to post and VFX.

Another example is the recent Danny Boyle directed movie *Yesterday*, shot by Christopher Ross BSC with multiple 8K RED cameras. In this case, DIT Thomas Patrick had to supervise the color and data workflow for the concert scenes, which utilized up to 17 cameras. Patrick worked with Mission, mentioned above, to design an array of 10 Flanders Scientific calibrated

monitors, which enabled him and Chris Ross to monitor the feeds from all the cameras. He also designed a color pipeline which began on-set with live grading but then continued with DaVinci Resolve so he could iron out inconsistencies between the lenses. In addition, he was responsible for planning how many and what capacity RED MINI-MAGS were required to store the large amount of data generated (10-15 TB per day) as well as figuring out when reloads would take place and supervising the two people responsible for wrangling data at the concerts.

DITs like Francesco Giardello and Thomas Patrick, along with many others, have taken the role of the DIT to a new level.



SUCCESS STORY: JOKER CINEMATOGRAPHER: LAWRENCE SHER Release: 2019

### JOKER SHOWS OFFVISUAL POWER OFTHE ALEXA65

A CODEX Workflow Maintains Efficiency



Lawrence Sher, ASC has done what so many aspiring cinematographers can only dream of – in the space of two decades, he's gone from shooting no-budget productions to the

**biggest tentpoles in the circus.** With a non-standard background – he majored in economics at Wesleyan – Sher began in the mid-1990s, making some charming indies (*Kissing Jessica Stein*), followed by successful small-budget comedies (*Garden State*), and then a run of studio comedies and action flicks (*The Hangover* films, *The Dictator, The Dukes of Hazzard*). Then he made a graceful segue into action-VFX with *Godzilla: King of the Monsters* and put it all together with a socio-political drama that defies categorization and continues to crush it at the box office – *Joker*.



For most of the time that we've been living in a digital world, the idea of gaining front-end resolution wasn't really a major factor

Lawrence Sher

**How'd he do it?** "I always say it's attitude," says Sher. "Enthusiasm is going to get you a whole heck of a lot farther than talent. The talent is going to get you somewhere, and ultimately talent will be what drives you creatively. But I think the interpersonal aspects of filmmaking are paramount to your success. The stakes are really high. Everyone I know who works in film, in all departments, cares deeply about what they do. Because of that internal pressure we all put on ourselves, and the time limitations, production can be so stressful."

On *Joker*, Sher reteamed with director Todd Phillips. It was their sixth film together. "I see my number one job as a cinematographer as taking away some of that burden for the director," says Sher. "Having now directed a film [*Father Figures*, starring Owen Wilson, Ed Helms and Glenn Close], I can empathize even more. As a director, you can feel alone on an island, peppered with a thousand questions every day. The most important thing you can get from your

collaborators is some help with that weight, so it's not all on your shoulders. I wake up every day caring as deeply about the movie as they do and wanting just as much for it to succeed. And I think that's been a key part of what success I've had."

Sher says that one helpful habit of the mind is to approach each day as if he's already two hours behind. "Every single moment of shooting is a way to make sure that we get everything we want to get over the course of that day," he says.



On *Joker* and *Godzilla: King of the Monsters*, Sher and his team shot with the ARRI ALEXA 65, maintaining that efficiency with a CODEX workflow. DIT Nick Kay used a workflow built around the ARRI ALEXA 65 and CODEX tools like the Vault 65 and Transfer Drives. The additional data for 5K resolution was deemed worth it by the studio in part because the camera team knew it wouldn't slow things down appreciably.

"The workflow was seamless," says Sher. "For most of the time that we've been living in a digital world, the idea of gaining front-end resolution wasn't really a major factor. But I think there's been a tipping point this year. As we approached *Joker*, making the decision to shoot ALEXA 65 in 5K, people at Warner Bros. seemed to appreciate having a 4K master – something that wasn't usually an option just a year or two ago. With everything that comes into play – the various deliverables, future-proofing, and archiving – whatever the reason, I felt that this year there was a shift at the major studios. Once we made the decision, we pushed it forward with no problems at all."

Phillips and Sher agreed on the format in part because the larger sensor facilitated using depth of field to isolate Joaquin Phoenix in the frame. "It's a character study, and we knew it would be told a lot in close-ups," says the cinematographer. "A 40mm can give you a medium lens feel but still have the field of view of a wider lens and allowing the camera to be physically closer to the actor, which conveys a certain feeling."



Sher shot nearly two dozen features on film emulsion before making the switch to digital. "When Nick and I worked together on *The Dictator* [2012], the ALEXA had been out for a year or so and ARRIRAW didn't exist," he recalls. "*Extremely Loud and Incredibly Close* was being made at about the same time, so it was in the early stages. The recorders were external, and producers suddenly had to deal with new line items that had not previously existed, like data management. Nick was amazing at working that all out."

Soon after that, ARRIRAW was made dependable, convenient and fast by the advent of incamera CODEX recording. Eventually, CODEX played a crucial role in adapting the data science to the exponentially bigger files produced by the ALEXA 65. The result has been new visual power for cinematographers and directors.

"When I'm considering changes in technology, I ask whether it comes with caveats," says Sher. "When digital got to the point where we could shoot it and treat it like film without any exceptions, then you could make the decision aesthetically. That was a game-changer. And now, with the ALEXA 65, the technology was the right tool for *Joker*. I'm very happy with the look of the film."



Camera Type: ARRI ALEXA 65 Camera Rental by: ARRI Rental US Director: Todd Phillips Director of Photography: Lawrence Sher DIT: Nick Kay



### cinematic whichever way you view it



Smartphone | Tablet | Desktop | Large Screen